STUDIES IN ANTARCTIC LICHENS II:

Lichens from the Windmill Islands, Wilkes Land.

by

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SUMMARY

The lichen collections from the Windmill Islands are enumerated together with a key and description of each species. Two new species, *Buellia soredians* and *Lecidea andersonii*, are described and figured. Figures are provided for those species not already illustrated in the author's *The Lichens and Mosses of Mac.Robertson Land* (Filson, 1966).

INTRODUCTION

The Windmill Islands are a group of islands and peninsulas on the eastern side of Vincennes Bay on the Budd Coast, Wilkes Land, at approximately 66° 20'S. and 110° 30'E. They were first visited by U.S. Navy Survey ships during "Operation Windmill" in 1947–48 and later on by the Australian National Antarctic Research Expedition (ANARE) in 1956. In 1956, the Russian Survey Expedition also visited these islands. The U.S. National Academy of Sciences chose this locality for a station during the International Geophysical Year, and the construction of "Wilkes" Station at the western tip of the Clarke Peninsula was completed by U.S. Operation Deepfreeze II early in 1957. The United States operated Wilkes Station until 1959 when it was handed over to ANARE for use by Australian scientists. Wilkes was used by ANARE until 1969 when it was replaced by the more modern "Casey" station on the northern side of the Bailey Peninsula.

VEGETATION

The vegetation of the area consists almost entirely of lichens but a few mosses occur there also. Llano (1959 : 11) reported: "The area around IGY Wilkes Station was biologically the richest of all those investigated. The dominant lichen, *Umbilicaria* was well represented by the cosmopolitan *Umbilicaria decussata*, ... The wide variety and extent of the cryptogamic flora suggests that the land area around Vincennes Bay has been exposed for a long time."

Apart from these notes, no comprehensive report on the flora has been published. As part of his *Lichenological Notes on the Flora of the Antarctic Continent and the Subantarctic Islands* series, Dodge (1965 : 528) described *Physcia llanoi* as a

* National Herbarium of Victoria.

Muelleria 3 (1) : 9–36 (1974).

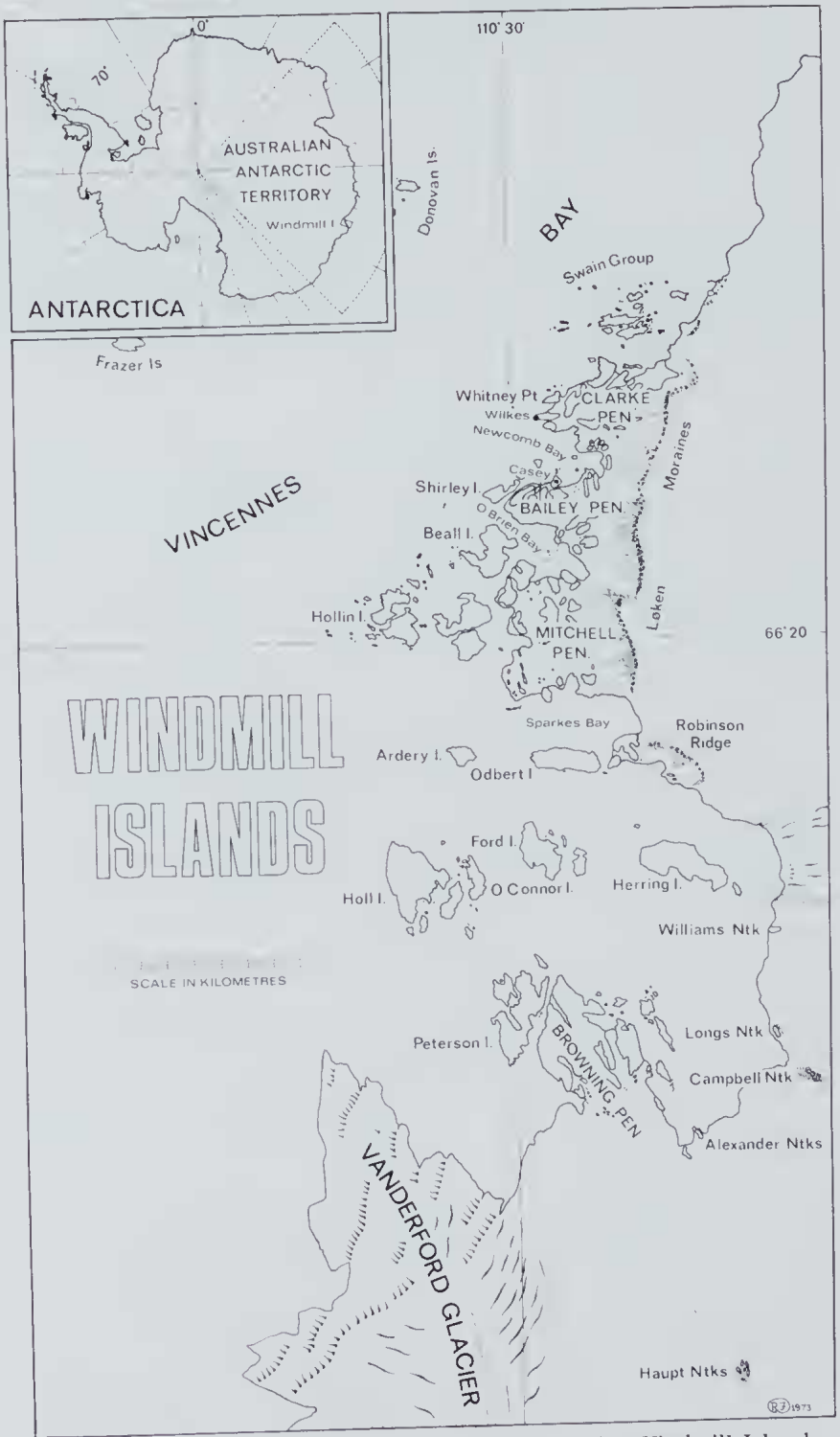

Fig. 1.—Map of part of the Budd Coast showing the Windmill Islands.

new species from Wilkes Station. The present author has not seen the type material of this species but suggests that it might prove to be conspecific with *Physcia caesia* (Hoffm.) Hampe because ample material of this latter species was collected in the same locality by K. S. White in 1966. According to the type description, *Physcia llanoi* seems to be a non-sorediose species, but many non-sorediose lobes have been noted amongst the present collections and this condition could lead to confusion.

In a further issue of this series, Dodge (1968) described two more new species, *Buellia llanoi* which from the description

Fig. 2—Aerial view south-west over the Clarke Peninsula towards Casey. The Vanderford Glacier Tongue lies on the horizon. ANARE Photo 25553.

appears to be a colour variation of *Buellia frigida* Darb., and *Thelidium llanoi* which represents a genus unrepresented in our collections.

GEOLOGY

The geology of the Windmill Islands has been treated in a preliminary report on the Bedrock Geology (Robertson, 1959) and the following summary of each of the collecting areas is based on this report.

Clarke Peninsula is composed of migmatite which consists of approximately 65 per cent gneiss and 35 per cent granitic material. The migmatite exhibits many small folds which are

superimposed on the southern limb of the large syncline, the axis of which lies north of the peninsula. *Bailey Peninsula* is almost entirely migmatite and the rest is slightly garnetiferous biotite granite. The migmatite consists of approximately 80 per cent granitic phase and 20 per cent biotite or hornblende gneiss. *Mitchell Peninsula* has low rolling hills on the southern limb of the anticline and consists of migmatite in similar proportions to Bailey Peninsula. The migmatite is cut by a sub-parallel system of diabase dykes. The granite phase of the migmatite is granitoid, creamy coloured and slightly foliated. *Robertson Ridge* consists of igneous rocks in the central portion, but north and south sides consist of altered metamorphic rocks while the south-west corner exhibits a variety of altered rocks. This area shows the best exposure of the contact of the gneiss and the intermediate rocks of the stock. *Odbert Island* lies to the west of Robertson Ridge. Its bedrock is quartz diorite and represents the northern limit of the stock. Two wide vertical fine-grained black diabase dykes altered to a more basic rock type occur here. *Browning Peninsula and Peterson Island* are separated from one another by a narrow channel developed along a fault. The most abundant rocks are grey, coarse porphyritic diorites, quartz diorite and granite which are all weathered to rusty brown. They are part of a stock which is intruded by gabbro dykes. The *Haupt Nunataks* cover about 16 hectares and consist mainly of gneisses and gneissic granite. They are fine-to-medium-grained buff to black and white rocks that weather to a rusty brown.

ARRANGEMENT OF THE GENERA

Acarosporaceae: *Biatorella*

Lecanoraceae: *Lecanora*

Lecideaceae: *Lecidea*

Physciaceae: *Buellia, Physcia, Rinodina*

Teloschistaceae: *Caloplaca, Protoblastenia, Xanthoria*

Umbilicariaceae: *Umbilicaria*

Usneaceae: *Alectoria, Usnea*

KEY TO THE WILKES LAND LICHENS

1. Thallus foliose or fruticose
   2. Thallus more than 1·5 cm tall
      3. Soredia pulvinate to subglobose..... ....24 *Usnea acromelana*
      3. Soredia eroded, convexed, abundant in the upper parts.....25 *Usnea antarctica*
   2. Thallus less than 1·5 cm tall
      4. Thallus umbilicate, usually a smooth or rugulose disc, mono-or polyphyllous

5. Lower surface with a few tufts of rhizines at the margins, thallus small, upper surface smooth or verrucose.....21 *Umbilicaria cristata*

5. Lower surface without rhizines, upper surface reticulately rugose.....20 *Umbilicaria decussata*

4. Thallus neither umbilicate nor monophyllous

6. Thallus greenish-orange to flame-scarlet.....19 *Xanthoria mawsonii*

6. Thallus not greenish-orange to flame-scarlet

7. Thallus lobes broad, imbricate, pale grey to brownish-grey, sorediose.....11 *Physcia caesia*

7. Thallus lobes narrow terete, pale brownish to black, esorediose

8. Thallus branches loosely entangled, never forming rosettes.....23 *Alectoria pubescens*

8. Thallus branches adnate to the substrate, forming rosettes.....22 *Alectoria minuscula*

1. Thallus crustose or squamulose

9. Thallus orange, yellow or greenish-yellow

10. Upper cortex K—

11. Thallus granular-sorediose; apothecia small and immersed in granules; ascus 8-spored.....18 *Protoblastenia citrina*

11. Thallus esorediose; apothecia large, hemispheric; ascus polyspored.....1 *Biatorella antarctica*

10. Upper cortex K+ purple

12. Thallus effigurate, forming large orange to flame scarlet rosettes; apothecia usually abundant .....17 *Caloplaca elegans* var. *pulvinata*

12. Thallus neither effigurate nor forming large rosettes, greenish-yellow to orange

13. Thallus sorediose; apothecia rare.....16 *Caloplaca citrina*

13. Thallus absent; apothecia abundant.....15 *Caloplaca athallina*

9. Thallus never orange, yellow nor greenish-yellow

14. Spores brown

15. Apothecia lecanorine

16. Thallus growing on rock.....13 *Rinodina petermannii*

16. Thallus growing over mosses or other lichens

17. Apothecia 1·0 — 1·5mm diam., spores 25 — 30μ × 10 — 11μ. . . . . 14 *Rinodina turfacea*

17. Apothecia 0·3 — 1·0mm diam., spores 16 — 21μ × 8 — 9μ. . . . . 12 *Rinodina archaeoides*

15. Apothecia lecideoid

18. Thallus effigurate

19. Hypothallus not developed. . . . . 5 *Buellia frigida*

19. Hypothallus developed. . . . . 7 *Buellia latemarginata*

18. Thallus not effigurate

20. Thallus growing on rock, usually with a dark radiate hypothallus

21. Thallus sorediose. . . . . 10 *Buellia soredians*

21. Thallus not sorediose. . . . . 8 *Buellia lignoides*

20. Thallus growing over mosses

22. Epithecium HNO_3+ purple-red, medulla I + ... 6 *Buellia grimmiae*

22. Epithecium HNO_3 —, medulla I —. . . . . 9 *Buellia cf. papillata*

14. Spores hyaline

23. Apothecia brown or black

24. Apothecia brown, margin concolorous with the thallus. . . . . 2 *Lecanora expectans*

24. Apothecia black, margin concolorous with the disc. . . . . 4 *Lecidea andersonii*

23. Apothecia cream, pinkish, greenish or dark green . . . . 3 *Lecanora rubina* var. *melanophthalma* forma *exsulans*

DESCRIPTION OF THE SPECIES

1. **Biatorella antarctica** Murray in *Trans. Roy. Soc. NZ.* 2 : 60 (1963).

Thallus in cerebriform humped areoles up to 3cm diam., and up to 10mm thick, bright sulphur-yellow, greenish in sheltered areas, held to the substratum by thin white hyphae which sometime penetrate deeply into the cracks in the rock. *Cortex* up to 50μ thick. *Algal cells* 8 — 13μ diam., forming scattered colonies throughout the medulla. *Medulla* of moderately woven hyaline branched hyphae 2·5 — 3·0μ diam. *Apothecia* up to 1·5 mm diam., convex to hemispheric, margin visible at first but disappearing at maturity. *Disk* sulphur-yellow or sometimes yellow-green, waxy. *Hymenium* hyaline, 65 — 85μ high including

the epithecium. *Epithecium* pale yellow, heavily encrusted with yellow crystals. *Paraphyses* regularly branched once or twice near the tips, 2μ diam., apical cell slightly expanded. *Asci* 50 $\times$ 16μ broadly clavate, with over 150 spores. *Ascospores* hyaline, ellipsoidal, unicellular, 2 — 3 $\times$ 2μ.

REACTIONS: K—, C—, P—, KC—, I—, UV-+ orange, hymenium I+ blue fading.

SPECIMEN EXAMINED: Bailey Peninsula, 1·5 km south of Casey Station, *D. J. Bishop*, 15.iii.1970 (MEL 1012061).

DISCUSSION: The only specimen collected in this area is represented by eight small areolae, each up to 1·5mm in diameter. Although these are sterile, they agree in detail with those found elsewhere. The apothecial measurements, quoted in the above description, are based on specimens from Mac.Robertson Land and are included here because the author feels certain that fertile specimens will eventually be located in this present study area.

2. **Lecanora expectans** Darb. in *Nat. Antarct. Exped. 1901–1904, Nat. Hist.* 5 : 7 (1910).

Thallus of small granules formed into rugose chunky areoles in areas up to 5mm diam., greyish white, cinereous, ecorticate. *Algal cells* up to 25μ diam., densely packed and forming a layer below the apothecia. *Apothecia* up to 1·2mm diam., round to irregular, pruinose, disk reddish-brown to black. *Margin* concolorous with the thallus, crenulate, pruinose, inrolled at first, expanding but remaining elevated well above the disk. *Cortex* continuous with the thallus, up to 30μ thick. *Hymenium* 50–65μ high including the brownish epithecium. *Paraphyses* straight, septate, simple, apical cell slightly expanded and covered by a large dark, gelatinous sheath 7μ diam. and 10μ long. *Ascus* 30–60 $\times$ 12–16μ, clavate, 8-spored. *Ascospores* 12–17 $\times$ 5–7μ, ellipsoid, slightly reniform, hyaline.

REACTIONS: K–, hymenium I+ deep blue, medulla I–, epithecium HNO_3–.

SPECIMEN EXAMINED: Bailey Peninsula, near Rx site, *D. J. Luders CB72/05d*, 8.xi.1972 (MEL 1011990).

DISCUSSION: The only specimen seen in this present study was typical of the species and it is represented by a small colony 1·3cm diam. growing over moss.

3. **Lecanora rubina** Ach. var. **melanophthalma** (Ram.) Zahlbr. forma **exsulans** (Th.Fr.) Zahlbr., *Cat. Lich. Univ.* 5 : 660 (1928)

Squamaria chrysoleuca (Sm.) Ach. var. *melanophthalma* (Ram.) Zahlbr. forma *exsulans* (Th.Fr.) in *Nytt Mag. Naturv.* 40 : 208 (1902)

Lecanora exsulans (Th.Fr.) Dodge & Baker in *Ann. Miss. Bot. Gard.* 25 : 570 (1938)

Lecanora exsulans forma *minor* Dodge in *BANZ. Antarct. Res. Exped. Rep.* 7 : 172 (1948)

Thallus composed of more or less round-lobed irregular and elongated frequently imbricated squamules 0·3–0·6mm × 0·2–0·5mm, light ochraceous buff to greenish-grey, in scattered colonies amongst other lichens. *Cortex* 25–30μ thick. *Algal layer* up to 200μ thick, cells 6–10μ diam. *Apothecia* 0·5–4·0mm diam., ochraceous buff, nickel green to greenish-black, concave. *Margin* concolorous with the thallus, smooth, crenulate and irregular, becoming folded into cerebriform masses. *Hymenium* 75–100μ high. *Paraphyses* simple or rarely branched. *Asci* clavate 60–75 × 10–17μ. *Ascospores* simple, ellipsoid, hyaline 12–15 × 4–6μ.

Reactions: K–, C–, P–, KC+ yellowish, medulla I–, hymenium+ deep blue, epithecium HNO_3+ pale brownish red.

Chemistry: Usnic acid only in G.E.

Specimens Examined: Clarke Peninsula, Wilkes Station, *W. A. Groom*, 1966 (with *Umbilicaria decussata*, MEL 26105); Clarke Peninsula, at the head of Powell Cove, *B. M. Allwright*, 15.i.1972 (with *Umbilicaria decussata*, MEL 1012018); Bailey Peninsula, 1·5km south of Casey Station, *D. J. Bishop*, 15.iii.1970 (with *Biatorella antarctica*, MEL 1012061); Bailey Peninsula, downhill to north-east of GII, *R. Anderson*, 27.ii.1969 (with *Usnea antarctica*, MEL 1012026); rock outcrop on the north coast of Mitchell Peninsula, due south of small island in O'Brien Bay, *R. Anderson*, 2.iii.1969 (MEL 1012021); Peterson Island, *D. J. Luders CB72/17 (in part)*, 21.xi.1972 (with *Buellia frigida*, MEL 1012009); northern site, Peterson Island, *R. Anderson*, 5.i.1970 (MEL 1012045); Browning Peninsula, near plateau, *R. Anderson*, 5.i.1970 (with *Umbilicaria decussata*, MEL 1012041); eastern side, Haupt Nunataks, *R. Anderson*, 3.i.1970 (with *Buellia lignoides*, MEL 1012030).

Discussion: This species in most instances grows in association with other lichens. The individual samples are typical and show the same variation in colour as those occurring in Mac. Robertson Land (Filson, 1966 : 50). Apothecia of those growing in direct sunlight range from deep sea-green to blackish-green, but those in shaded situations are pinkish-buff and all colour variations between the two may be found in a single colony.

The epithet *exsulans* was altered *to exulans* in Zahlbruckner, *Catalogus Lichenum Universalis* 5 : 660 and many authors have perpetuated this form of the word.

4. **Lecidea andersonii** R. Filson sp. nov. [Fig. 3.]

Species nova ex affinitate *L. phillipsianae* differt sic: apothecium grande, marginatum, nunquam hemisphaericum; hypothecium pallidiore et commutatio iodina in medulla positiva.

Thallus crustose, brownish to greyish-white, irregular, often developing below the surface of the cracks in rocks so that the

Fig. 3.—*Lecidea andersonii* R. Filson: a–portion of the TYPE specimen (MEL 1012035); b–section of an apothecium from MEL 1012074; c–e–from a crushed mount of MEL 1012035; c–a paraphysis; d–a developing and an empty ascus; e–ascospores.

apothecia appear to fill them. *Upper cortex* 10–12μ thick, of blackish aeruginose cells which terminate the hyphae of the medulla and with an amorphous covering 8–10μ thick. *Algal layer* 60–75μ thick, composed of cells up to 15μ diam. *Medulla* closely woven, hyphae 3–5μ thick. *Apothecia* black, up to 1·5mm diam. *Margin* thick, black, persistant. *Disk* flat to slightly convex, never hemispheric to subspherical. *Hypothecium* thin up to 45μ thick in the centre, pale brownish. *Hymenium* 50–60μ high capped by a dark aeruginose epithecium 10–15μ thick. *Paraphyses* 2μ diam. slightly expanded at the apical cell to 4μ, concrete in hymenial gel which will not separate easily in water under pressure. *Asci* 8–spored, 25–45 $\times$ 12μ. *Ascospores* 9–10 $\times$ 4–5μ, simple, ellipsoidal, hyaline.

Reactions: K—, C—, P—, KC—, I+ deep violet-purple, cortex I+ violet, HNO_3+ crimson, hypothecium I+ violet, asci I+ pale blue, epithecium HNO_3+ crimson.

Specimens Examined: Western side of the Haupt Nunataks, *R. Anderson,* 3.i.1970 (MEL 1012035—HOLOTYPE); Haupt Nunataks, *D. J. Bishop,* 24.x.1970 (MEL 1012074).

Discussion: This *Lecidea* appears totally different from any other described from Antarctic regions. It is similar to *Lecidea phillipsiana* from the Mac.Robertson Land region but differs in the large marginate apothecia which never become hemispheric, the paler hypothecium, and in the reaction of iodine on the medulla. The author has much pleasure in naming this lichen after its first collector, Ross Anderson, glaciologist at Casey during 1969.

5. **Buellia frigida** Darb. in *Nat. Antarct. Exped. 1901–1904, Nat. Hist.,* 5 : 7 (1910).

Rinodina frigida (Darb.) Dodge in *BANZ. Antarct. Res. Exped. Rep.* 7 : 259 (1948)

Thallus crustose, effigurate, up to 15cm diam., variable, sometimes thick, sometimes very thin, varying in colour from white to black, sometimes cream to buff and where shaded deeply cut with cracks, the whole surface breaking up into angular areoles, marginal lobes 0·5–1·2mm long and 0·2–0·4mm wide. *Cortex* 25–40μ thick of fastigiate hyphae capped by an upper cortex of greenish brown cells 5–7μ diam., and up to 12μ thick, covered by a hyaline decomposed layer 10–12μ thick. *Algal layer* 57–75μ thick with cells 7–15μ diam. *Apothecia* black, dull, sometimes shining, sessile or subsessile, immersed, with the thallus forming a greyish margin. *Disk* flat, convex to hemispheric 0·6–0·8mm diam. *Medulla* of loosely woven brownish hyphae. *Hypothecium* 25–30μ thick faintly brownish. *Hymenium* 50–100μ high. *Paraphyses* branched or unbranched with apical cells 5μ diam., forming a greenish-brown epithecium. *Asci* clavate 12–20 × 35–55μ. *Ascospores* 6–10 × 8–15μ, elliptical, slightly constricted or not constricted at the septum, uniseptate or rarely undivided, thin-walled, dark grey, becoming dark brown at maturity.

Reactions: K–, C–, P–, medulla I–, hymenium I+ deep blue, Epithecium HNO_3+ purple-red.

Specimens Examined: Clarke Peninsula, Wilkes Station, *K. S. White,* xi.1966 (MEL 26102); Clarke Peninsula, east of Whitney Point, *R. Anderson,* 15.i.1970 (with *Xanthoria mawsonii,* MEL 1012053); Clarke Peninsula, near NMA/S/39, *B. M. Allwright,* 15.i.1972 (with *Alectoria minuscula,* MEL 1012010); Bailey Peninsula, near Rx site, *D. J. Luders CB72/03,* 8.xi.1972 (MEL 1011985); Bailey Peninsula, near the Receivers Hut, *D. J. Luders CB72/02,* 19.ix.1972 (MEL 1011996); Odbert Island, *D. J. Luders CB72/09* 13.xi.1972 (MEL 1011998); Peterson Island, *D. J. Luders CB72/17,* 21.xi.1972 (MEL 1012009); Peterson Island, northern site, *R. Anderson,* 5.i.1970 (MEL 1012046); Peterson Island, southern site, *R. Anderson,* 5.i.1970 (MEL 1012043); Browning Peninsula, near plateau, *R. Anderson,*

5.i.1970 (MEL 1012042); Browning Peninsula, north-eastern side, *D. J. Bishop*, 26.x.1970 (MEL 1012065); Browning Peninsula, western side, *D. J. Bishop*, 25.x.1970 (MEL 1012071).

6. **Buellia grimmiae** R. Filson in *ANARE Sci. Rep. Ser. B.* (II) *Bot.* 82 : 37 (1967).

Thallus continuous, forming a crust over mosses, smooth, divided into areolae by fine black wrinkles. *Cortex* 10μ thick, blackish. *Medulla* of closely woven brownish hyphae. *Apothecia* sessile, 0·5–1·0mm diam., at first concave becoming flat to slightly convex. *Disk* black, carbonaceous. *Margin* prominent, crenulate, black, shining. *Hypothecium* hyaline or faintly brownish 60–80μ thick. *Parathecium* brownish-black. *Hymenium* up to 150μ high. *Paraphyses* simple or branched, 2μ thick, expanded at the apices to 5μ, the last 2 or 3 cells darkening forming a dark epithecium up to 20μ thick. *Asci* 60–90 × 16–20μ. *Ascospores* 15–25 × 10–12μ at first grey becoming brownish at maturity.

Reactions: Thallus and medulla K–, C–, P–, KC–, medulla I+ intense violet, hymenium I+ pale blue, epithecium HNO_3+ purple-red.

Specimen Examined: Haupt Nunataks, *D. J. Bishop*, 24.x.1970 (MEL 1012078).

Discussion: When more collections of moss cushions are gathered it is most likely that more specimens of this species will be found. The specimen from Haupt Nunataks was typical though in parts badly eroded. It formed a crust up to three centimetres in diameter over the top of a cushion of *Bryum* sp.

7. **Buellia latemarginata** Darb. in *Wiss. Ergebn. schwed. Südpölarexped.*, 4 : 15 (1912). [Fig. 4 h–l.]

Thallus crustose, discontinuous, subeffigurate at the margins, dark grey to blackish, matt, non-sorediate. *Cortex* thin, hardly differentiated. *Algal cells* scattered throughout the areole, up to 12μ diam. *Medulla* compact. *Hypothallus* black, thin, narrow, discontinuous. *Apothecia* rare, 0·5–0·8mm diam., black. *Margin* black, thin, disappearing at maturity. *Hypothecium* brown to dark brown. *Hymenium* up to 75μ high, hyaline with a thin, dark brown epithecium. *Paraphyses* simple or branched, apical cell expanded to 6μ. *Asci* clavate, 8-spored, 45 × 21μ. *Ascospores* dark brown, ellipsoid, thinly septate, 12–15 × 7–9μ, occasionally slightly curved and constricted at the septum.

Reactions: Medulla K–, C–, P–, KC–, I–, asci I+ blue fading, epithecium HNO_3–.

Specimens Examined: Clarke Peninsula at G5, *R. Anderson*, 15.i.1970 (MEL 1012052); Bailey Peninsula, downhill to north-east of G11, *R. Anderson*, 27.ii.1969 (MEL 1012028).

Discussion: The author has not seen any authenticated material of this species but it agrees well with the key and descriptions in Lamb (1968 : 14, 50). The specimens from our area do not show the white zone around the outermost edge of

the hypothallus as described by Lamb, but in his discussion (1968 : 52) of *Lecidea actinobola* Hue, Lamb states that his specimens from Vega Island, Graham Land also lacked this feature.

8. **Buellia lignoides** R. Filson in *ANARE Sci. Rep. Ser. B.* (II) *Bot.* 82 : 38 (1967).

Thallus crustose, composed of small squamules 0·5–1·0mm diam., varying in colour from pale brownish to dark grey and black. *Hypothallus* extensive, black, confervoid, openly reticulate or sometimes more or less continuous. *Cortex* 15μ thick, of large, dark spherical cells. *Algal cells* scattered 10–15μ diam. with a sheath. *Medulla* thickly woven. *Apothecia* up to 0·5mm diam., small, immersed at first, becoming sessile, slightly flattened to subspherical, sometimes covering the whole areole, black, sometimes appearing pruinose. *Hypothecium* up to 100μ thick in the centre, hyaline or faintly tinged with brown. *Hymenium* 45–60μ high including the dark epithecium, 10–15μ thick. *Paraphyses* 1·5–2·0μ thick, expanding into heads of 5μ diam. *Asci* 35–40μ, clavate with 8 spores. *Ascospores* 2-celled, 10–12 $\times$ 6–9μ, thin-walled, slightly constricted at the septum, at first grey becoming brown.

Reactions: K–, C–, P–, KC–, I+ intense violet, hymenium I+ blue fading, epithecium HNO_3+ purple-red.

Specimens Examined: Western side of the Haupt Nunataks, *R. Anderson*, 3.i.1970 (MEL 1012037); eastern side of the Haupt Nunataks, *R. Anderson*, 3.i.1970 (MEL 1012030).

Discussion: These two specimens from different localities on the Haupt Nunataks are macroscopically identical with the samples from Mac.Robertson Land. Internally the present collection agrees well with the type material with the one exception that the spores are slightly smaller. This species was previously collected in the Vestfold Hills, Princess Elizabeth Land, by G. W. Johnstone, and the present collections extend the range a little further around eastern Antarctica.

9. **Buellia** cf. **papillata** (Sommerf.) Tuck. *Lichens of California* 26 (1866). [Fig. 5.]

Thallus crustaceous, forming an irregular crust over mosses, eroded, thick, white or greyish-white. *Apothecia* minute, 0·2–0·5mm diam. black, margin prominent and becoming thin but not disappearing. *Hypothecium* brown to dark brown. *Hymenium* up to 60μ high, hyaline. *Asci* 40 $\times$ 18μ, 8-spored. *Ascospores* 12–18 $\times$ 7–9μ, 2-celled, brown, walls and septum of equal thickness though rarely thickened at the septum.

Reactions: Medulla K–, C–, P–, KC–, I–, hymenium I+ blue fading, epithecium HNO_3–.

Specimen Examined: Bailey Peninsula, near Rx site, *D. J. Luders CB72/05c*, 19.ix.1972 (MEL 1011989).

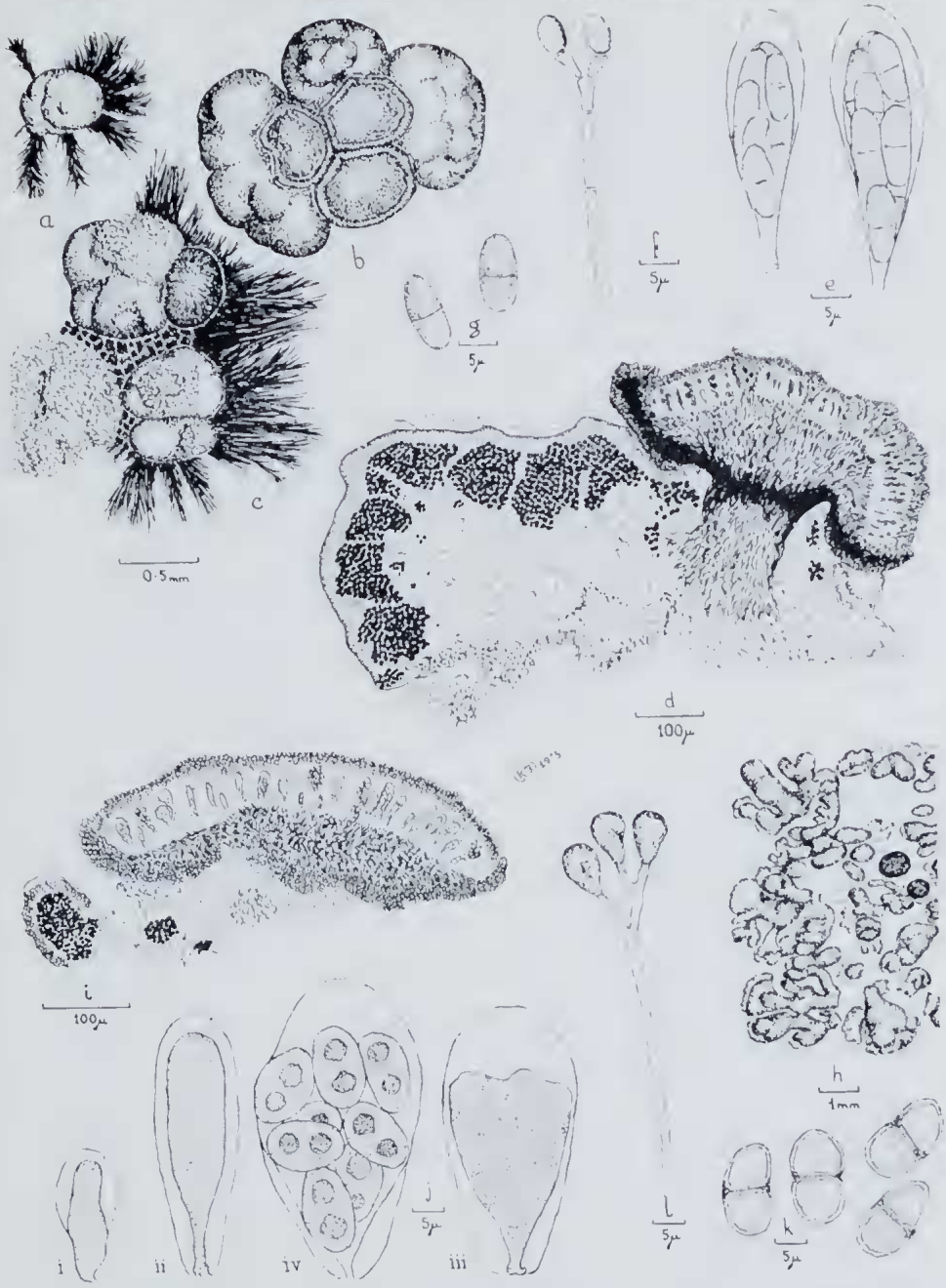

Fig. 4.—a–g–*Buellia soredians* R. Filson (from the TYPE specimen MEL 1012012); a–c–habitat details: a–young areolae on dendritic hypothallus; b–apothecia and areolae without visible hypothallus; c–sorediose areolae one with apothecia on radiate hypothallus; d–section of apothecium; d–developing asci; f–a branched paraphysis; g–ascospores. h–l–*Buellia latemarginata* Darb; h–habitat detail from MEL 1012028 showing areolae and apothecia; i–section of an apothecium; j–stages in development of asci (in KOH); k–ascospores; l–a branched paraphysis.

Discussion: This specimen appears very similar to *B. grimmiae* but differs in having smaller apothecia, smaller spores, and a negative reaction of the medulla with iodine. According to the key in Lamb (1968 : 14) it would be referred to *B. punctata* (Hoffm.) Mass. or *B. papillata* (Sommerf.) Tuck. It is similar to *B. punctata* in most of its measurements, apothecia, asci, and spores but differs in its general appearance. *B. punctata* is described as having a very thin effuse thallus, and certainly specimens found in Australia agree with this. On the other hand *B. papillata* is described as being thick, nodulose-verrucose. Macroscopically our material fits the latter description. The

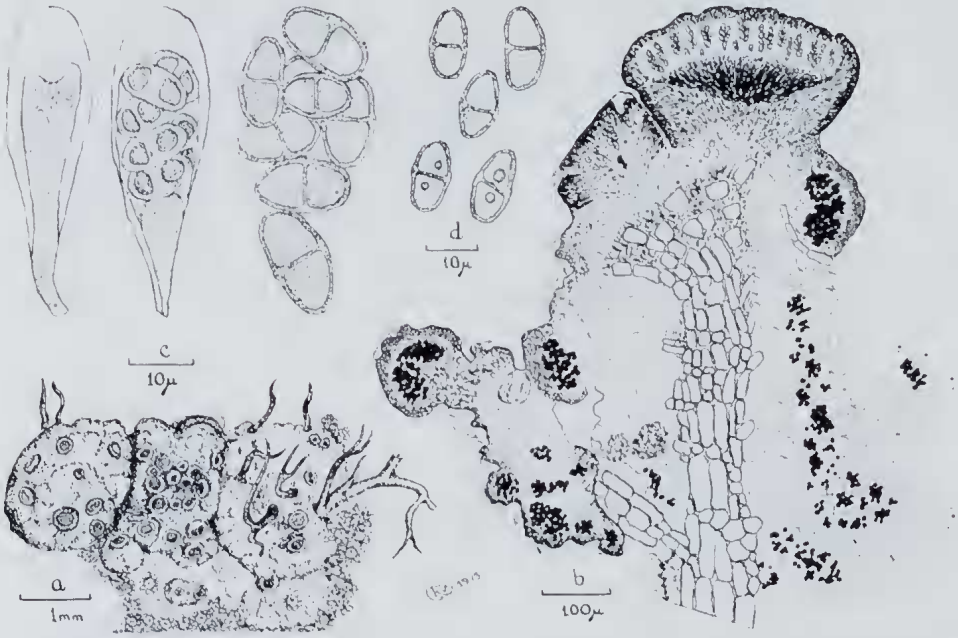

Fig. 5—*Buellia cf. papillata* (Somerf.) Tuck.: a–habitat details of MEL 1011989 growing amongst mosses; b–section of apothecia and areolae on a moss; c–two stages in the development of an ascus and a cluster of spores from the hymenium; d–ascospores showing thickening at the septa.

spores, although slightly smaller than those given for *B. papillata*, agree well with the figure in Lynge (1928 : pl. IV, f. 15–17) where in fig. 17, he shows a slight thickening at the septum. More specimens must be collected before we can be certain if this is a modification of either of the aforementioned species or is in fact a separate entity.

10. **Buellia soredians** R. Filson sp. nov. [Fig. 4 a–g.]

Thallus crustaceus, squamulae pulvinatae, hemisphaericae, laeves, nunc soraliis erosis concavis nunc omnino sorediosus atque pulvinos hemisphaericos formantibus.

Thallus crustose, composed of squamules up to 1·5mm diam., pulvinate, hemispherical, pale brown to dark isabelline in exposed

positions, smooth, sometimes with an eroded concave soralia, sometimes completely sorediate and forming pulvinate clumps up to 4mm diam. *Cortex* 15–20μ thick. *Algal layer* discontinuous up to 120μ thick. *Algal cells* up to 15μ diam. *Medulla* compact. *Hypothallus* well developed, black, carbonaceous, aeruginose at the extreme margin, at first dendritic becoming continuous at maturity. *Apothecia* 0·3–0·7mm, sessile, black. *Margin* prominent. *Hypothecium* thick, dark brown. *Hymenium* up to 60μ high, brownish. *Epithecium* up to 10μ thick, dark brown. *Paraphyses* 2μ thick, branched, apical cell expanded to 4μ diam. *Asci* 35 × 12μ with 8 spores. *Ascospores* 4–6 × 9–10μ, thin walled, septate, not constricted at the septum, pale grey to brown.

Reactions: Medulla K–, C–, P–, KC–, I–, hymenium I+ blue, epithecium HNO_3–, hypothallus HNO_3 + purple-red.

Specimen Examined: Clarke Peninsula, near NMA/S/39, *B. M. Allwright*, 15.i.1972 (MEL 1012012—HOLOTYPE).

Discussion: This new species is distinctive because it is the first sorediose *Buellia* recorded from the Antarctic continent. Although as yet known from only one collection, the material is ample. Unfortunately there were only four apothecia on the specimen and one was sectioned for the above descriptions.

11. **Physcia caesia** (Hoffm.) Hampe in *Fürnr. Naturh. Topogr. Regensberg.* 2 : 250 (1839).

Thallus of narrow, branching, imbricate lobes, 140–260μ thick and 0·5–3·0mm broad, smooth becoming verrucose, light grey to grey-brown, sorediose. *Underside of thallus* buff, darkening to nearly black with scattered tufts of branched rhizines, varying from light buff to dark brown. *Cortex* 15–20μ (–70μ) thick. *Algal layer* 50–80μ thick, sometimes extending to the top of the cortex and occasionally with odd cells embedded in the medulla. *Algal cells* up to 20μ diam. *Medulla* up to 25μ thick of hyphae not too tightly packed hyaline or faintly tinged with brown. *Lower cortex* 25–60μ thick, of compactly woven thick-walled hyphae, hyaline with the outer 10μ darkening, rhizines outgrowing from these hyphae. *Rhizines* formed of compactly woven, thick walled hyphae 50–100μ diam., cells elongated, 7–15 × 4μ. *Apothecia* not seen.

Reactions: Thallus K+ yellow, C–, P+ pale yellow, medulla K+ yellow, P–.

Specimen Examined: Clarke Peninsula, Wilkes Station, *K. S. White*, xi. 1966 (with *Protoblastenia citrina* MEL 26104).

Discussion: The specimens here are a little more brownish in appearance than in the typical form but the author considers them to be referable to this species because of the shape of the

lobes and the formation of the soredia. Possibly this colour may be attributed to the locality near melt pools and to the degree of exposure.

12. **Rinodina archaeoides** H.Mag. *Medd. Fran Göteborgs Bot. Trädg.* 17 : 278 (1947).

Thallus subsquamulose, covering areas up to 12cm in diam., spreading over mosses or amongst loose gravels, olive brown to dark brown, with a thick amorphous layer covering the outside sometimes giving the whole plant a white gelatinous appearance. *Apothecia* abundant, irregularly shaped by pressure, up to 1·0mm in diam. *Margin* crenulate, concolorous with the thallus or slightly lighter. *Disk* dark brown to black. *Cortex* 25–40μ thick, continuous and of the same structure as the thallus. *Algal cells* up to 12μ diam. continuing under the hymenium. *Hypothecium* thin, hyaline. *Hymenium* 80–100μ high. *Paraphyses* thin, branched, apical cell slightly expanded. *Asci* 60–90 $\times$ 16–20μ, clavate 8-spored. *Ascospores* 16–21 $\times$ 8–9μ, 2-celled, dark brown.

Reactions: K–, C–, P–, KC–, medulla I–, Hymenium I–, hypothecium I+ pale blue, epithecium HNO_3–.

Specimens Examined: Bailey Peninsula, west of Casey Station near nest site S16, *D. J. Luders CB72/15b*, 7.xii.1972 (MEL 1011992); Browning Peninsula, *D. J. Bishop*, 26.x.1970 (with *Caloplaca athallina* MEL 1012070).

Discussion: Amongst the collections brought back from the study area there are very few collections of moss cushions thus accounting for the lack of specimens of this lichen. The samples here cited are typical and agree in every detail with other collections examined by the author from elsewhere in Antarctica.

13. **Rinodina petermannii** (Hue) Darb. in *Brit. Antarct. Terra Nova Exped. 1901–1904 Nat. Hist. Rep. Bot.* 3 : 61 (1923). [Fig. 6 g–j.]

Lecanora petermannii Hue, in *Deux. Exped. Antarct. Francaise 1908–1910* 96 (1915).

Thallus crustose, lobate-effigurate at the margins, centre parts pulvinate, verrucose, fawn to pale brown in sheltered places, brownish-to blackish-brown in exposed places, matt, often pruinose, up to 8mm thick in the centre. *Cortex* up to 30μ thick. *Medulla* loosely compacted of hyphae up to 5μ diam. *Apothecia* 0·3–1·0mm diam. *Margin* prominent, concolorous with the thallus, persistent. *Disk* concave, brownish-black to black, matt, sometimes pruinose. *Hypothecium* hyaline, up to 75μ thick in the centre. *Hymenium* up to 90μ high. *Paraphyses* simple, apical cell reddish-brown, expanded to 4–5μ. *Asci* 50–80 $\times$ 21–27μ, 8-spored. *Ascospores* 16–22 $\times$ 9–10μ brown, 2-celled, sometimes slightly constricted at the septum.

Reactions: K–, C–, P–, KC–, I–, hymenium I + blue fading in the upper parts but remaining constant in the lower.

Specimen Examined: Peterson Island, *R. Anderson*, 5.i.1970 (MEL 1012047).

Discussion: The single specimen in this collection represents the only sample of *Rinodina* found growing on rock in the region. Unfortunately it was removed from the rock and only the central parts of the thallus remain, but these are clearly lobate and agree exactly with the description and figures in Lamb (1968 : 30, plate XIV).

14. **Rinodina turfacea** (Wahlenb.) Körb., *Syst. Lich. Germ.* 123 (1855). [Fig. 6 a–f.]

Lichen turfaceus Wahlenb. *Flora Lapponica* 408 (1812).

Thallus granulose or verruculose, growing over the tops of mosses or amongst fruticose lichens, drab brown, matt. *Apothecia* abundant, up to 1·5mm diam. *Margin* entire or crenulate, concolorous with the thallus. *Disk* brownish-black, matt. *Hypothecium* hyaline up to 30μ thick. *Hymenium* hyaline, up to 90μ high, with a reddish-brown epithecium. *Paraphyses* branched, slightly expanded at the tips. *Asci* 5–8-spored, 65–75 × 21–30μ. *Ascospores* 24–33 × 12–15μ, 2-celled, dark brown.

Reactions: K–, C–, P–, I–, hymenium I + blue fading, hypothecium I + violet becoming dark blue, epithecium HNO_3–.

Specimens Examined: Clarke Peninsula, Wilkes Station, *W. A. Groom*, 1966 (with *Usnea antarctica* MEL 26100); Clarke Peninsula, near NMA/S/39, *B. M. Allwright*, 15.i.1972 (MEL 1012011); rock outcrop on the north coast of Mitchell Peninsula due south of small island in O'Brien Bay, *R. Anderson*, 2.iii.1969 (with *Protoblastenia citrina* MEL 1012023).

Discussion: The specimens from Clarke Peninsula were all growing in association with other lichens. One sample had almost covered a rosette of *Alectoria minuscula* whilst other rosettes had numerous colonies amongst their filaments. Another sample had encrusted the holdfasts and lower parts of several thalli of *Usnea antarctica*. The specimens from Mitchell Peninsula are typical, growing over mosses and fine gravels.

None of the specimens examined by the author showed any reaction with iodine on the apothecial cortex. Variable reports have been discussed: Magnusson (1947: 203, 263) says that it has a faint but distinct blue coloration, Poelt (1969: 591) also gives the cortex as blue with iodine but M. Lamb (1968: 63) reports a faint, and apparently inconsistent fleeting reaction in some specimens.

Fig. 6—a–f: *Rinodina turfacea* (Wahlb.) Korb.: a–habitat detail from MEL 1012011 showing thallus growing on *Alectoria minuscula;* b–habitat showing thallus growing with *Protoblastenia citrina* at the base of *Usnea antarctica;* c–f: from MEL 1012011; c–section of apothecia: d–stages in development of asci; e–ascospores; f–branched paraphysis; g–j–*Rinodina petermanii* (Hue) Darb; g–habitat detail from MEL 1012047; h–section of apothecia; i–development of the ascus; j–ascospores.

15. **Caloplaca athallina** *Darb. in Wiss. Ergebn. Schwed. Südpolar-Exped. 1901–1903* 4 (11): 9 (1912). [Fig. 7.]

Pyrenodesmia athallina (Darb.) Dodge & Baker in *Ann. Miss. Bot. Gard.* 25 : 621 (1938).

Thallus forming patches up to 2cm diam. over mosses, not well developed, almost covered by crowded apothecia, grey to yellowish-grey. *Cortex* discontinuous, formed by dark outer cells up to 30μ thick, capped by a hyaline amorphous layer up to 8μ thick. *Algal layer* continuous, up to 20μ thick, consisting of cells up to 18μ diam. *Apothecia* numerous, round, sometimes deformed by mutual pressure, 0·3–0·75mm diam. *Disk* flame-orange, concave to slightly hemispheric. *Margin* slightly raised at maturity, concolorous with the disk. *Hypothecium* thin hya-

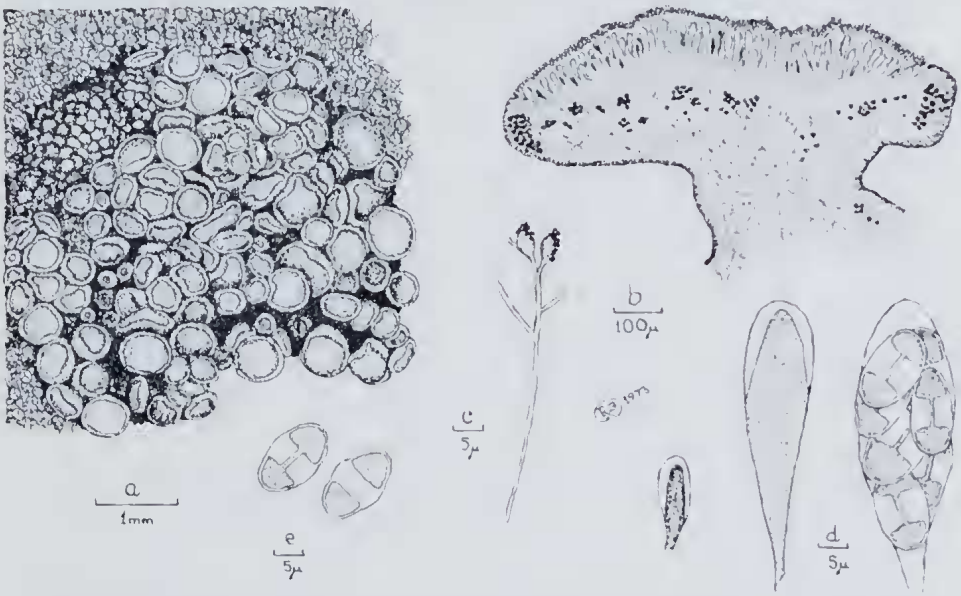

Fig. 7—*Caloplaca athallina* Darb.: a–habitat detail from MEL 1011991 showing crowded apothecia growing over mosses; b–section of apothecia; c–branched paraphysis; d–development of asci; e–ascospores.

line. *Hymenium* hyaline up to 90μ high. *Paraphyses* simple or branched 2μ thick; apical cell expanded to 6μ, thickly encrusted with yellowish crystals. *Asci* 8-spored, 60 × 21μ *Ascospores* 15–16 × 9–10μ, hyaline, polaribilocular.

Reactions: Cortex K+ purple, medulla K—, epithecium K+ red, hymenium I+ blue, medulla I—.

Specimens Examined: Bailey Peninsula west of Casey Station near nest Nr. 16, *D. J. Luders CB72/15a*, 7.xii.1972 (MEL 1011991); Browning Peninsula, *D. J. Bishop*, 25.x.1970 (MEL 1012070).

Discussion: The author has not examined the type material of this species but specimens from the Australian Antarctic

Territory agree with Darbishire's description and figure. The spore sizes given by Darbishire are slightly smaller than those in the present material but they are still considered to be within an acceptable range.

16. **Caloplaca citrina** (Hoffm.) Th.Fr. in *Nova Acta Sci. Upsal.*, Ser. 3, 3 : 281 (1861).

Verrucaria citrina Hoffm. *Deutschl. Flora* 198 (1796).

Pyrenodesmia mawsonii Dodge in *BANZ. Antarct. Res. Exped. Rep.* 7 : 232 (1948).

Thallus squamulose, up to 1cm diam., growing over the tops of mosses or in pulvinate clumps on rock. *Squamules* up to 1mm diam., florida gold to yellow-orange, smooth, becoming sorediose until squamule is completely enveloped in yellow-green soredia. *Cortex* up to 35μ thick. *Algal cells* up to 20μ diam., scattered throughout the medulla. *Medulla* of thin-walled hyphae 4μ diam. *Apothecia* not seen.

Reactions: Thallus K+ purple, medulla K—, C—, P—.

Specimens Examined: Bailey Peninsula, Casey Station near transmitter hut, *D. J. Bishop*, 24.ii.1970 (MEL 1012056); Bailey Peninsula, near Rx site, *D. J. Luders CB72/05b*, 8.xi.1972 (MEL 1011988); Peterson Island, *D. J. Luders CB72/14e*, 21.xi.1972 (MEL 1012008).

17. **Caloplaca elegans** (Link.) Th.Fr. var. **pulvinata** (Dodge & Baker) J. Murray in *Trans. Roy. Soc. NZ.* 2 : 64 (1963).

Polycauliona pulvinata Dodge & Baker in *Ann. Miss. Bot. Gard.* 25 : 628 (1938).

Thallus bright orange-red to yellow-chrome in shaded places, up to 11cm in diam., with radiating appressed or imbricate lobes, lobes hollow or filled with loosely woven hyaline thin-walled hyphae, esorediose, sometimes forming clumps up to 2cm high. *Algal layer* evenly distributed around the lobes and varying in thickness up to 100μ. *Algal cells* 8–10μ diam. *Lower cortex* 25μ thick, consisting of subspherical cells 5–7μ diam., the lower 5–10μ, yellowish. *Apothecia* up to 2mm diam., at first concave, later becoming flat or moderately convex. *Margin* smooth or slightly crenulate, concolorous with the thallus. *Disk* deep orange-red. *Hymenium* 60–75μ high. *Asci* 50–65 $\times$ 14–20μ, clavate, becoming long-ellipsoid. *Ascospores* ellipsoid, hyaline, polaribilocular, canal mostly present in mature spores, very variable in size, 7–10 $\times$ 11–16μ.

Reactions: Thallus K+ purple, medulla K—, I—, hymenium I+ deep blue, epithecium K+ red-purple.

Specimens Examined: Peterson Island, southern site, *R. Anderson*, 5.i.1970 (MEL 1012044); Peterson Island, *D. J. Luders CB72/16*, 21.xi.1972 (MEL 1012003).

Discussion: This is a coastal species and it is expected to occur on the adjacent Browning Peninsula and on Odbert Island.

18. **Protoblastenia citrina** Dodge in *BANZ. Antarct. Res. Exped. Rep.* 7 : 222 (1948).

Thallus granular, composed of spherical granules in clumps up to 5mm diam., lemon-yellow to yellow-orange, granules up to 100μ diam., ecorticate. *Algal cells* 8–12μ diam., scattered throughout the medulla. *Medulla* loosely packed, containing granules. *Apothecia* up to 0·4mm diam. concolorous with the thallus. *Disk* convex, yellow-orange. *Margin* thin, not elevated. *Hymenium* up to 65μ high. *Paraphyses* slender, 2μ diam., simple or branched, tips slightly thickened and encrusted with yellowish crystals. *Asci* clavate, 50–65 $\times$ 12–16μ. *Ascospores* unicellular, hyaline, ellipsoidal, 18 $\times$ 6μ.

Reactions: K–, C–, P–, medulla I–, hymenium and hypothecium I+ pale bluish-green fading.

Specimens Examined: Clarke Peninsula, 800m north-east of old Wilkes Station, *B. M. Allwright*, 15.i.1972 (MEL 1012017); Clarke Peninsula, to the east of Whitney Point, *R. Anderson*, 15.i.1970 (with *Xanthoria mawsonii*, MEL 1012053); Bailey Peninsula, near Rx site, *D. J. Luders CB72/06*, 8.xi.1972 (MEL 1011986); rock outcrop on the north coast of Mitchell Peninsula, due south of small island in O'Brien Bay, *R. Anderson*, 2.iii.1969 (MEL 1012023); Odbert Island, *D. J. Luders CB72/08 (in part)*, 13.xi.1972 (with *Buellia frigida*, MEL 1011999); Peterson Island, *D. J. Luders CB72/13*, 21.xi.1972 (MEL 1012002); Browning Peninsula, *D. J. Bishop*, 26.x.1970 (MEL 1012068).

19. **Xanthoria mawsonii** Dodge in *BANZ. Antarct. Res. Exped. Rep.* 7 : 236 (1948).

Thallus in pulvinate tufts up to 2cm diam. and up to 1cm high, lobes irregularly palmate, 0·1–1·0mm wide and up to 2mm long, florida gold in exposed places, greenish buff in sheltered positions, attached to the substratum by small holdfasts, with or without rhizines. *Upper cortex* up to 20μ thick, outer 8μ heavily-encrusted with yellowish-brown crystals. *Algal layer* discontinuous and consisting of cells up to 25μ diam., scattered or in small colonies throughout the medulla. *Medulla* of loosely-woven branched and anastomosing hyphae. *Lower cortex* similar in thickness and structure to the upper cortex. *Apothecia* not seen.

Reactions: Thallus K+ purple.

Specimens Examined: Clarke Peninsula, Wilkes Station, *K. S. White*, xi. 1966 (MEL 26106); Clarke Peninsula, to the east of Whitney Point, *R. Anderson*, 15.i.1970 (MEL 1012053); Odbert Island, *D. J. Luders CB72/12*, 13.xi.1972 (MEL 1012000).

20. **Umbilicaria decussata** (Vill.) Zahlbr. *Cat. Lich. Univ.* 8 : 490 (1942). [Fig. 8 a–c.]

Lichen decussatus Vill. *Hist. Plant. Dauphine* 3 : 964 (1789). *Omphalodiscus decussatus* (Vill.) Schol. in *Nyt. Mag. Naturvid.* 75 : 23 (1934).

Thallus monophyllous, sometimes polyphyllous, 0·5–5·0cm diam., variable, rugose to cerebriform and deeply folded, rugi elevated into fine reticulate patterns or broadly or laterally compressed into strongly formed ridges. *Upper surface* rimose, areolate, pruinose, dull, varying in colour from light grey olive, wood brown to grey and black. *Lower surface* brown to sooty black, dull, without rhizines. *Decomposed layer* discontinuous, hyaline, up to 25μ thick. *Upper cortex* 20–40μ thick, continuous. *Algal cells* 8–12μ diam. *Medulla* of thick walled, septate, branched hyphae 6μ diam., very loosely packed. *Lower cortex* 40–115μ thick, with outermost layer dark brown. *Apothecia* very rare, 0·3–1·4mm diam., black, carbonaceous, adnate to the thallus. *Disk* flat, sometimes fissured, older specimens appearing gyrose. *Hypothecium* dark brown. *Hymenium* up to 70μ high, pale brown. *Paraphyses* simple or branched, apical cell slightly expanded. *Asci* c. 45 × 18μ. *Ascospores* hyaline, simple, c. 9 × 7μ.

Reactions: K–, C–, P–, hymenium I–, asci outer sheath I + blue, asci inner sheath and contents I + red, medulla I–.

Specimens Examined: Clarke Peninsula, Wilkes Station, *W. A. Groom*, 1966 (MEL 26105); Clarke Peninsula, near NMA/S/39, *B. M. Allwright*, 15.i.1972 (MEL 1012015); Clarke Peninsula, at the head of Powell Cove, *B. M. Allwright*, 15.i.1972 (MEL 1012018); Clarke Peninsula, at G5, *R. Anderson*, 15.i.1972 (MEL 1012050); Clarke Peninsula, old transmitter hut site, *D. J. Bishop*, 11.ix.1970 (MEL 1012062); Bailey Peninsula, near Receivers Hut, *D. J. Luders CB72/01*, 19.ix.1972 (MEL 1011995); Bailey Peninsula, downhill to the north-east of G11, *R. Anderson*, 2.iii.1969 (MEL 1012027); Bailey Peninsula, south-west corner, *D. J. Bishop*, 19.iii.1970 (MEL 1012081); rock outcrop on the north coast of Mitchell Peninsula due south of small island in O'Brien Bay, *R. Anderson* 2.iii.1969 (MEL 1012022); Mitchell Peninsula, *D. J. Bishop*, 15.iv.1970 (MEL 1012064); Browning Peninsula, near plateau, *R. Anderson*, 5.i.1970 (MEL 1012041); Alexander Nunataks, northern outcrop, *D. J. Bishop*, 24.x.1970 (MEL 1012063); eastern side of Haupt Nunataks, *R. Anderson*, 3.i.1970 (MEL 1012033); western side of Haupt Nunataks, *R. Anderson*, 3.i.1970 (MEL 1012038); Haupt Nunataks, *D. J. Bishop*, 24.x.1970 (MEL 1012076).

Discussion: The specimens from Clarke Peninsula, at the head of Powell Cove, are the first fertile specimens that the author has seen from the Antarctic Continent. On the sample

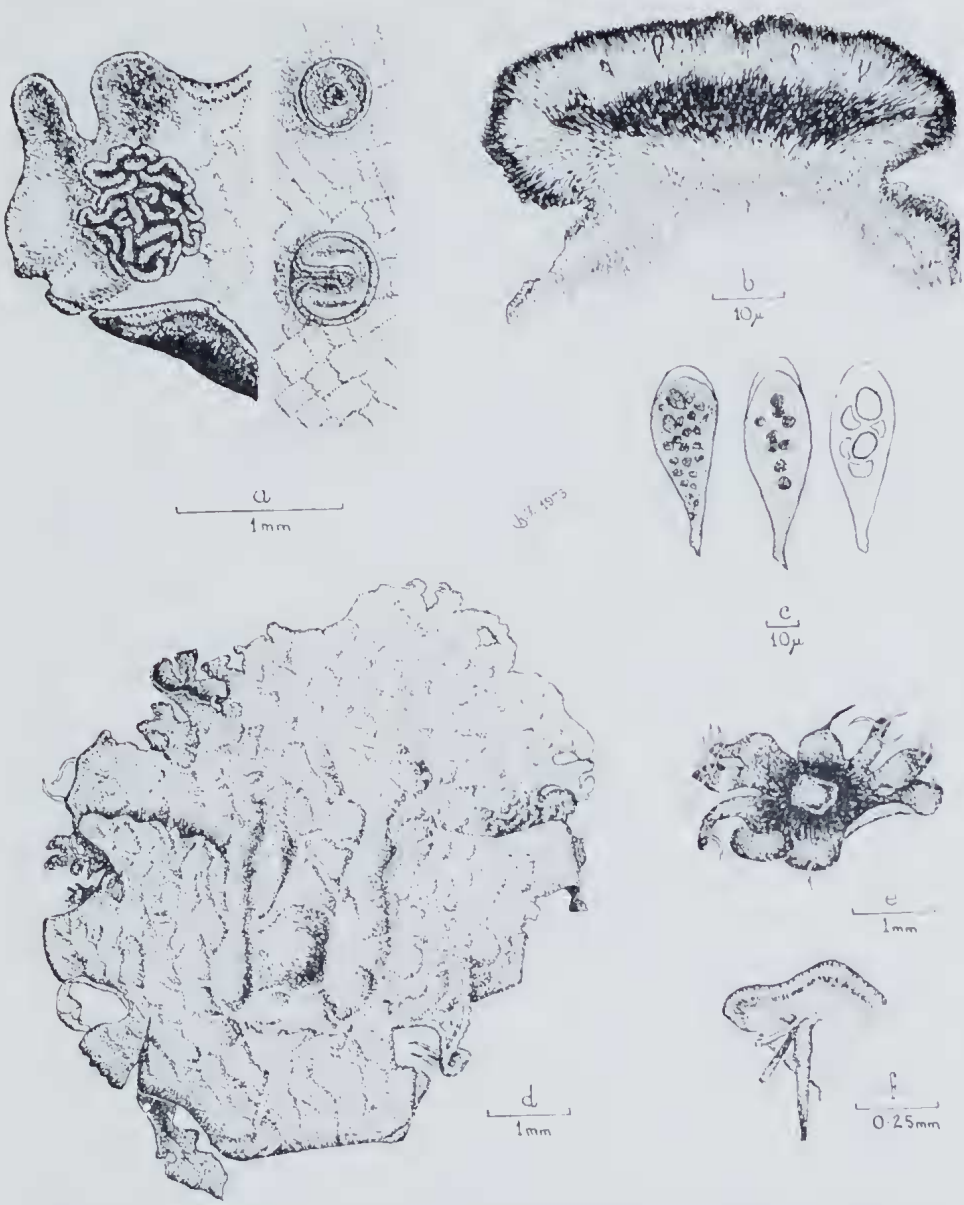

Fig. 8—a–c–*Umbilicaria decussata* (Vill.) Zahlbr.: a–apothecia on separate thalli from MEL 1012018; b–section of apothecia; c–three asci from the hymenium in Melzers reagent, d–f–*Umbilicaria cristata* Dodge and Baker: d–thallus from MEL 1012077; e–underside of thallus and sparse rhizines and a detail of rhizines.

were twenty-five thalli and of these only three were fertile. One thallus contained eight, one six and the other two apothecia. Three apothecia were sectioned but it was not possible to separate the hymenium sufficiently to accurately measure the asci and spores. However the measurements that were obtained compared favourably with those obtained from Australian specimens. The reactions on the asci with iodine (Melzers reagent) were the same in both specimens from Australia and the Antarctic—the outer sheath stained blue whilst the inner sac and spores took up the iodine colour.

21. **Umbilicaria cristata** Dodge & Baker in *Ann. Miss. Bot. Gard.* 25 : 565 (1938). [Fig. 8 d–e.]

Thallus small, up to 8mm diam., monophyllous, smooth or rugose, margin entire or deeply lacerate with tufts of rhizinae; *upper surface* dull and varying in colour from wood brown to blackish; *lower surface* dark brown lighter towards the margins. *Apothecia* not seen.

Specimen Examined: Haupt Nunataks, *D. J. Bishop*, 24.x.1970 (MEL 1012077).

Discussion: This species could have been overlooked by inexperienced collectors because the seven thalli represented in this collection were growing in very close association with *Umbilicaria decussata*. Owing to the small number of thalli none were sectioned nor chemically examined. The specimens agree with the type description in Dodge (1938) and also agree with the description and key in Llano (1950, pp. 113, 118). Llano gives thalline measurements as up to 3cm diam. The material from the study area is much smaller than this but further collecting may yield larger examples.

22. **Alectoria minuscula** (Nyl. ex Arnold) Degel. in *Nytt Mag. Naturv.* 78 : 286 (1938).

Thallus forming intricately branched, dense, flat rosettes up to 3cm diam., sometimes radiating, sometimes completely filling cracks between rocks, the filaments sometimes tend to fuse together [forma *congesta*] and sometimes form large cerebriform, vernicose masses [forma *crustacea*]. *Filaments* up to 0·2mm diam. varying in colour from isabelline to black, from sooty to glossy. *Cortex* 20μ thick consisting of longitudinal hyphae, outermost 5μ greenish-brown. *Medulla* of loosely-woven hyphae with numerous air spaces. *Algal colonies* scattered mostly immediately next to the cortex. *Algal cells* 10–12μ diam., with a gelatinous sheath. *Apothecia* not seen.

Reactions: K–, C–, P–.

Specimens Examined: Clarke Peninsula, Wilkes Station, *W. A. Groom*, 1966 (MEL 26103); Clarke Peninsula, near NMA/S/39, *B. M. Allwright*, 15.i.1972 (MEL 1012010); Clarke Peninsula, at G5. *R. Anderson*, 15.i.1970 (MEL 1012051); Bailey

Peninsula downhill to the north-east of G11, *R. Anderson,* 2.iii.1969 (MEL 1012029); western face of the Bailey Peninsula *D. J. Luders CB72/04,* 19.ix.1972 (MEL 1011997); Bailey Peninsula near the Casey Station water supply, *D. J. Bishop,* 24.x.1970 (MEL 1012080); rock outcrop on the north coast of the Mitchell Peninsula, due south of small island in O'Brien Bay, *R. Anderson,* 2.iii.1969 (MEL 1012020); Browning Peninsula, near plateau, *R. Anderson,* 5.i.1970 (MEL 1012040); western side of Haupt Nunataks, *R. Anderson,* 3.i.1970 (MEL 1012036); eastern side of Haupt Nunataks, *R. Anderson,* 3.i.1970 (MEL 1012032); Haupt Nunataks, *D. J. Bishop,* 24.x.1970 (MEL 1012072).

23. **Alectoria pubescens** (L.) Howe jr. *Class. Fam. Usneaceae* 23 (1912). [Fig. 9.]

Thallus prostrate, forming a low felted mat. *Filaments* terete, thread-like, isabelline in the shade, brownish to black in exposed positions. *Cortex* up to 35μ thick of longitudinal hyphae. *Medulla* loosely woven. *Algal colonies* scattered, mostly next to the cortex, cells up to 15μ diam. *Apothecia* not seen.

REACTIONS: K–, C–, P–, KC–.

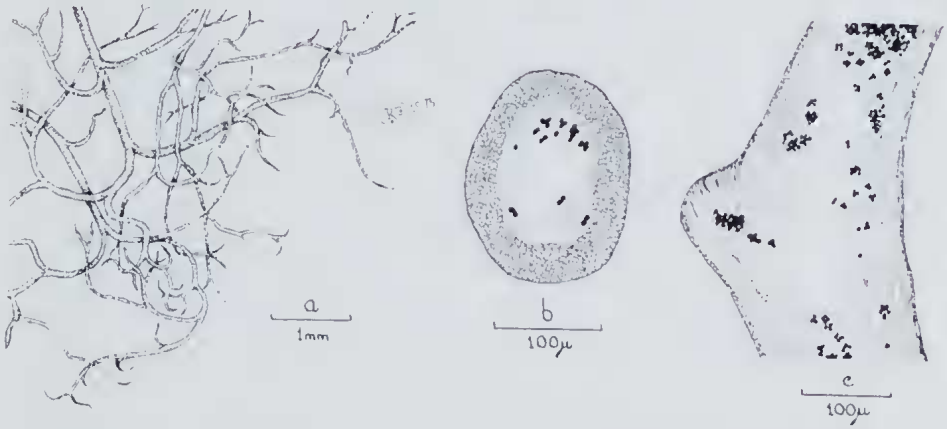

Fig. 9—*Alectoria pubescens* (L.) Howe jr.: a–portion of MEL 1012019; b–cross section of thallus; c–longitudinal section of thallus.

SPECIMEN EXAMINED: Rock outcrop on north coast of Mitchell Peninsula, due south of small island in O'Brien Bay, *R. Anderson,* 2.iii.1969 (MEL 1012019).

DISCUSSION: Surprisingly this is the first record of the occurence of this species in this sector of the Antarctic Continent, but it has a wide distribution in East and West Graham Land (Lamb, 1964 : 27). The specimen cited here was growing on an erratic rock with *Alectoria minuscula.*

24. **Usnea acromelana** Stirt. in *Trans. Proc. NZ. Inst.*, 30 : 388 (1898). [Fig. 10.]

Thalli tufted, many arising from a common basal holdfast, up to 3cm tall, sparingly branched, rigid, lower parts smooth pale yellow-green, up to 1·5mm thick, upper branches black or with black bands, smooth, shining, sorediose. *Soredia* pulvinate to subglobose. *Cortex* irregular, 45–120μ thick. *Algal cells* up to 10μ diam., mostly in colonies next to the cortex. *Medulla* up to 120μ thick, loosely packed with many air spaces. *Axis* solid, up to 500μ thick in the thicker main branches, composed of longitudinal conglutinate hyphae. *Apothecia* not seen.

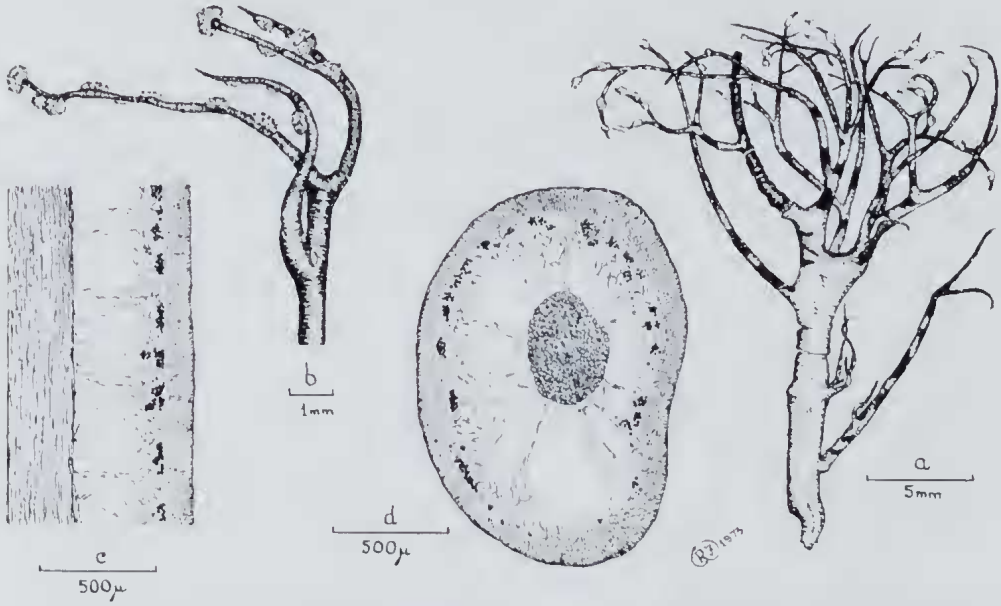

Fig. 10—*Usnea acromelana* Stirt.: a–portion of tuft showing a single branch of MEL 1012059; b–an ultimate branch showing pulvinate soralia; c–longitudinal section of thallus; d–cross section of thallus.

REACTION: K–, C–, P–, KC–.

CHEMISTRY: The specimens from the study area all occur in the inactive phase. Usnic acid was the only constituent demonstrated.

SPECIMENS EXAMINED: Bailey Peninsula, downhill to north G11, *R. Anderson*, 27.ii.1969 (MEL 1012025); Bailey Peninsula, near transmitter hut, *D. J. Bishop*, 24.ii.1970 (MEL 1012059); Bailey Peninsula, south-west corner, *D. J. Bishop*, 19.iii.1970 (with *Umbilicaria decussata*, MEL 1012081); Bailey Peninsula near Rx site, *D. J. Luders CB72/07a*, 8.xi.1972 (MEL 1011983).

DISCUSSION: This species appears to be confined to the Bailey Peninsula where it is widely distributed. In most cases it was in association with *Usnea antarctica* so it is possible that it may have been overlooked in other localities.

25. **Usnea antarctica** Du Rietz in *Svensk. Bot. Tidskr.* 20 : 93 (1926).

Neuropogon antarcticus (Du Rietz) M. Lamb in *Journ. Linn. Soc. Lond. Bot.* 52 : 210 (1939).

Thallus erect or subprostrate. 1–5cm tall, irregularly branched, rigid, verrucose, rugose, slightly foveolate, straw colour to pale yellow-green, up to 1·5mm thick at the base, at times somewhat constricted at attachment, uppermost tips of the branches black or with black bands, smooth, shining, sorediose, but in old specimens sometimes black, dull and extremely eroded. *Soredia* usually abundant, foveolate, convexed, whitish-yellow. *Cortex* 60μ thick. *Algal cells* up to 8μ diam., scattered in small colonies throughout the medulla. *Medulla* up to 160μ thick, white, dense against the cortex, becoming looser near the axis. *Axis* solid 45–150μ thick, composed of longitudinal conglutinate hyphae 1μ diam. *Apothecia* not seen.

Reactions: K–, C–, P–, KC–.

Chemistry: All of the specimens from the study area occur in the typical or inactive phase. Usnic acid was the only constituent demonstrated.

Specimens Examined: Clarke Peninsula, Wilkes Station, *W. A. Groom*, 1966 (MEL 26100); Clarke Peninsula, near NMA/S/39, *B. M. Allwright*, 15.i.1972 (with *Alectoria minuscula*, MEL 1012010); Clarke Peninsula, at G5, *R. Anderson*, 15.i.1970 (MEL 1012049); Bailey Peninsula, near Rx site, *D. J. Luders CB73/07b*, 8.xi.1972 (MEL 1011984); Bailey Peninsula, downhill to the north of G11, *R. Anderson*, 27.ii.1969 (MEL 1012026); Casey Station, *D. J. Bishop*, 6.ii.1971 (MEL 1012054); rock outcrop on north side of Mitchell Peninsula due south of small island in O'Brien Bay, *R. Anderson*, 2.iii.1969 (with *Lecanora rubina* var. *melanophthalma*, forma *exsulans*, MEL 1012021); moraine at east end of Robinson Ridge, *R. Anderson*, 2.iii.1969 (MEL 1012024); Browning Peninsula, near the plateau, *R. Anderson*, 5.i.1970 (MEL 1012039); north-east side of Browning Peninsula, *D. J. Bishop*, 26.x.1970 (MEL 1012066); eastern side of Haupt Nunataks, *R. Anderson*, 3.i.1970 (MEL 1012034); western side of the Haupt Nunataks, *R. Anderson*, 3.i.1970 (with *Alectoria minuscula*, MEL 1012036); Haupt Nunataks, *D. J. Bishop*, 24.x.1970 (MEL 1012073).

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ACKNOWLEDGMENTS

The author extends his sincere thanks to Barry Allwright, Ross Anderson, David Bishop, Tony Groom, Dave Luders, Kevin White and other members of the Australian National Antarctic Research Expeditions who collected specimens on the Windmill Islands. He also extends his thanks to Mr. J. H. Willis for assistance with the botanical latin describing the two new species. Finally the author wishes to thank Dr. Knowles Kerry, Senior Biologist, Antarctic Division, Department of Science, for reading the manuscript and making helpful comments for improving the text.